

Final

Remarks: General

Applicant wishes to thank the Examiner for scheduling the time to conduct a personal interview in this application.

The claims have been amended by rewriting Claim 11 to add thereto the limitations of Claims 15 and 17, and canceling Claims 15 and 17 without prejudice to or disclaimer of the subject matter thereof. As the limitations added to Claim 11 derive from Claims 15 and 17, no new matter is added by this amendment.

The amendment to Claim 11 has been made for the purpose of removing from the scope of the claims only the tetrameric compound disclosed by U.S. Patent No. 4,171,298.

As the amendments to Claims 16 and 18 have been only for the purpose of correcting dependencies, those amendments are not related to patentability.

A supplemental Information Disclosure Statement ("IDS") pursuant to 37 CFR §1.98 is enclosed, for which the fee stated in §1.17(p) is due by reason of §1.97(c)(2). Please charge this fee to Deposit Account No. 04-1928 (E.I. du Pont de Nemours and Company).

A petition under 37 CFR §1.136 for a two-month extension of time to respond the Examiner's action is enclosed, the fee for which should be charged to Deposit Account No. 04-1928.

If any fee other than or in addition to those mentioned specifically above is required to authorize or obtain consideration of this response and the enclosed IDS, please charge such fee to Deposit Account No. 04-1928.

Claims 11-14, 16, 18-21 and 34 are now active in the application. Applicant hereby requests reconsideration and further examination of the application in view of the reasons it has set forth below for allowance of the claims.

Remarks: Detailed Action

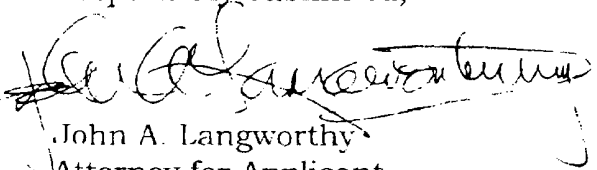
The Examiner has maintained the rejection under 35 U.S.C. §103(a) that Claims 11~21 and 34 are unpatentable over US 4,171,298 ("Minagawa"). Claims 15 and 17 have been canceled.

As previously noted by Applicant, (i) the structure shown in Column 15 of Minagawa is not a polymer or polymeric composition, but is rather at most a tetrameric compound, and (ii) the presence of a 2-orthoalkylhydroxybenzenepropane-1,3-diol in the compound of Minagawa does not fulfill the requirements of Claim 11 because the diol portion of the 1,3-diol that participates in the formation of the tetrameric compound is aliphatic not aromatic. With the amendment herein, Applicant has added further features to describe the component (2) and component (3) from which Applicant's polymeric composition is made, which features are not taught or suggested by Minagawa.

In view of the above distinctions between Minagawa and the subject matter of Claims 11~14, 16, 18~21 and 34, Applicant respectfully requests that the Examiner withdraw the rejection of those claims under 35 U.S.C. §103(a).

In view of the foregoing, Applicant submits that all of the Examiner's objections and rejections have been properly traversed, and that the pending claims are in condition for allowance, request for which is hereby respectfully made.

Respectfully submitted,


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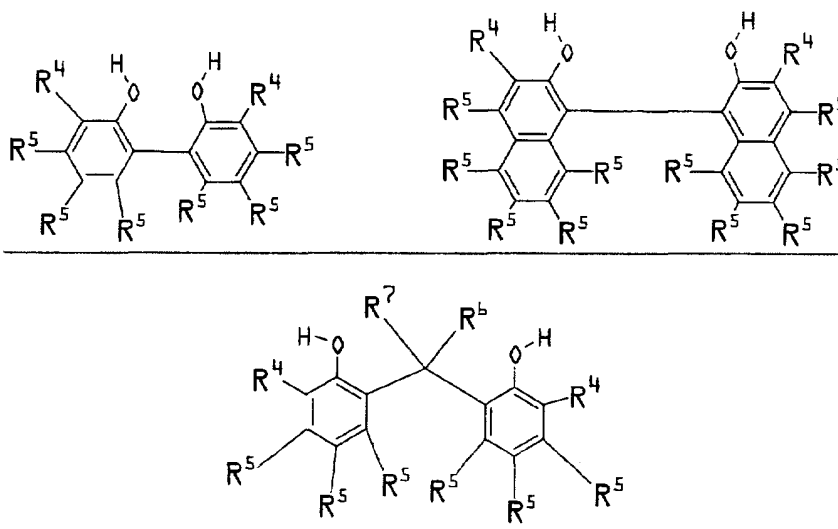
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Appendix A

- (i) Amendment to Claim 11
 in marked-up form, and
 (ii) Status of all other claims

1~10. (canceled)

11. (currently amended) A polymeric composition comprising repeat units derived from (1) phosphorus trichloride, (2) an aromatic polyhydric alcohol wherein the location of the OH groups thereof are placed such that, when the polyhydric alcohol is contacted with PCl_3 , monodentate phosphites are not predominately produced, and (3) an aromatic diol that has a formula selected from the group consisting of



and combinations of two or more thereof;

each R⁴ is independently selected from the group consisting of hydrogen, C₁ to C₁₂ alkyl or cycloalkyl group, acetal, ketal, -OR³, -CO₂R³, C₆ to C₂₀ aryl group, -SiR³, -NO₂, -SO₃R³, S(O)R³, S(O)₂R³, -CHO, -C(O)R³, -F, -Cl, -CN, -CF₃, -C(O)N(R³)(R³), -A¹Z, and combinations of two or more thereof;

Z is selected from the group consisting of $-\text{CO}_2\text{R}^3$, $-\text{CHO}$, $-\text{C}(\text{O})\text{R}^3$, $-\text{C}(\text{O})\text{SR}^3$, $-\text{SR}^3$, $-\text{C}(\text{O})\text{NR}^1\text{R}^1$, $-\text{OC}(\text{O})\text{R}^3$, $-\text{OC}(\text{O})\text{OR}^3$, $-\text{N}=\text{CR}^1\text{R}^1$, $-\text{C}(\text{R}^1)=\text{NR}^1$, $-\text{C}(\text{R}^1)=\text{N}-\text{O}-\text{R}^1$, $-\text{P}(\text{O})(\text{OR}^3)(\text{OR}^3)$, $\text{S}(\text{O})_2\text{R}^3$, $-\text{S}(\text{O})\text{R}^3$, $-\text{C}(\text{O})\text{OC}(\text{O})\text{R}^3$, $-\text{NR}^3\text{CO}_2\text{R}^3$, $-\text{NR}^3\text{C}(\text{O})\text{NR}^1\text{R}^1$, F, Cl, $-\text{NO}_2$, $-\text{SO}_3\text{R}^3$, $-\text{CN}$, and combinations of two or more thereof;

each R^3 is independently selected from the group consisting of C_1 to C_{12} alkyl or cycloalkyl group, C_6 to C_{20} aryl group, and combinations of two or more thereof;

each R^5 is independently selected from the group consisting of H, F, Cl, C_1 to C_{12} alkyl, C_1 to C_{12} cycloalkyl, C_6 to C_{20} aryl, $-\text{OR}^3$, $-\text{CO}_2\text{R}^3$, $-\text{C}(\text{O})\text{R}^3$, $-\text{CHO}$, $-\text{CN}$, $-\text{CF}_3$, and combinations of two or more thereof;

each R^6 independently is selected from the group consisting of H, C_1 to C_{12} alkyl, C_1 to C_{12} cycloalkyl, C_6 to C_{20} aryl, and combinations of two or more thereof; and

each R^7 independently is selected from the group consisting of H, C_1 to C_{12} alkyl, C_1 to C_{12} cycloalkyl, C_6 to C_{20} aryl, and combinations of two or more thereof.

12. (original) A composition according to Claim 11 wherein said polyhydric alcohol is selected from the group consisting of dialcohols, trialcohols, tetraalcohols, and combinations of two or more thereof.

13. (original) A composition according to Claim 12 wherein said polyhydric alcohol is selected from the group consisting of $(\text{R}^4)(\text{HO})_m\text{-Ar}^2\text{-A}^1\text{-Ar}^2\text{-(OH)}_m(\text{R}^4)$, $(\text{R}^4)(\text{HO})_m\text{-Ar}^2\text{-(O-A}^1)_p\text{-O-Ar}^2\text{-(OH)}_m(\text{R}^4)$, $(\text{R}^4)(\text{OH})_m\text{-Ar}^2\text{-Ar}^2\text{-(OH)}_m(\text{R}^4)$, $(\text{R}^4)(\text{OH})_m\text{-Ar}^2\text{-A}^2\text{-Ar}^2\text{-(OH)}_m(\text{R}^4)$, $(\text{R}^4)(\text{HO})_m\text{-Ar}^2\text{-A}^1\text{-C}(\text{O})\text{-O-A}^1\text{-O-C}(\text{O})\text{-A}^1\text{-Ar}^2\text{-(OH)}_m(\text{R}^4)$, $(\text{R}^4)(\text{OH})_m\text{-Ar}^1\text{-(OH)}_m(\text{R}^4)$, and combinations of two or more thereof;

each Ar^1 is independently selected from the group consisting of phenylene group, biphenylene group, naphthylene group, binaphthylene group, and combinations of two or more thereof;

each Ar^2 is independently selected from the group consisting of phenylene group, naphthylene group, and combinations thereof;

each A^1 is independently a C_1 to C_{12} alkylene group;

each A^2 is independently selected from the group consisting of

-C(R¹)(R¹)-, -O-, -N(R¹)-, -S-, -S(O)₂-, -S(O)-, and combinations of two or more thereof;

each R¹ is independently selected from the group consisting of hydrogen, C₁ to C₁₂ alkyl or cycloalkyl group, C₆ to C₂₀ aryl group, and combinations of two or more thereof;

each R⁴ is independently selected from the group consisting of hydrogen, C₁ to C₁₂ alkyl or cycloalkyl group, acetal, ketal, -OR³, -CO₂R³, C₆ to C₂₀ aryl group, -SiR³, -NO₂, -SO₃R³, -S(O)R³, -S(O)₂R³, -CHO, -C(O)R³, F, Cl, -CN, perhaloalkyl, -C(O)N(R³)(R³), -A¹Z, and combinations of two or more thereof;

Z is selected from the group consisting of -CO₂R³, -CHO, -C(O)R³, -C(O)SR³, -SR³, -C(O)NR¹R¹, -OC(O)R³, -OC(O)OR³, -N=C(R¹)R¹, -C(R¹)=NR¹, -C(R¹)=N-O-R¹, -P(O)(OR³)(OR³), -S(O)₂R³, -S(O)R³, -C(O)OC(O)R³, -NR³CO₂R³, -NR³C(O)N(R¹)R¹, F, Cl, -NO₂, -SO₃R³, -CN, and combinations of two or more thereof;

each R³ is independently selected from the group consisting of C₁ to C₁₂ alkyl or cycloalkyl group, C₁ to C₂₀ aryl group, and combinations thereof;

each m is independently a number in the range of from 1 to 2; and

each p is independently a number in the range of from 1 to 10.

14. (previously presented) A composition according to Claim 13 wherein

said polyhydric alcohol is selected from the group consisting of (OH)_m (R⁴)Ar¹-Ar¹(R⁴)(OH)_m and (OH)_m (R⁴)Ar¹-A¹-Ar¹(R⁴)(OH)_m;

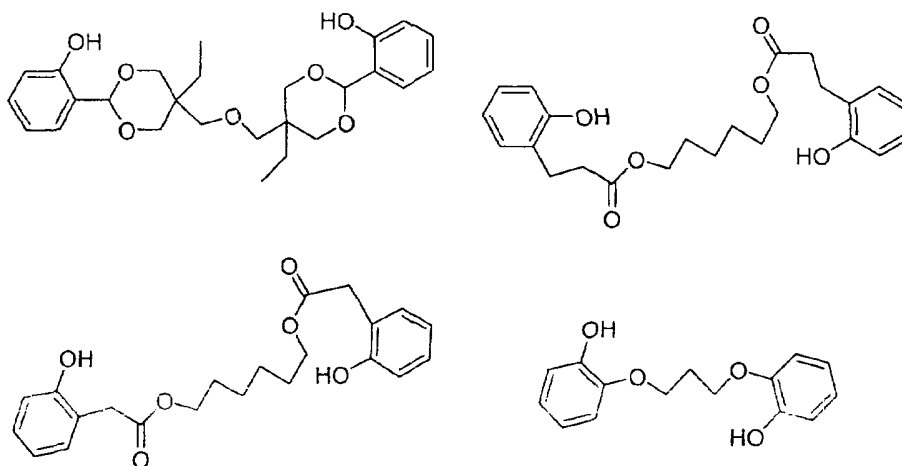
Ar¹ and A¹ are the same as recited in Claim 13; and

each R⁴ is independently selected from the group consisting of C₁ to C₁₂ alkyl or cycloalkyl group, acetal, ketal, -OR³, -CO₂R³, C₆ to C₂₀ aryl group, -SiR³, -SO₃R³, -S(O)R³, -S(O)₂R³, perhaloalkyl, -C(O)N(R³)(R³), -A¹CO₂R³, -A¹OR³ and combinations of two or more thereof.

15. (canceled).

16. (previously presented) A composition according to Claim 15 ~~11~~ said polyhydric alcohol is selected from the group consisting of 6,6'-dihydroxy-4,4',7,7',7'-hexamethyl bis-2,2'-spirochroman, 2,2'-

diallylbisphenolA, bisphenol A, 4,4'-(1-methylethylidene)bis(2-(1-methylpropyl)phenol), 4,4'-thiophenol, 4,4'-dihydroxydiphenylsulfone, 4,4'-sulfonylbis(2-methylphenol), bis(4-hydroxy-3-methylphenyl)sulfide, 2,2'-dis(4-hydroxy-3-methylphenyl)propane, 4,4'-ethylidenebis(2,5-dimethylphenol), 4,4'-propylidenebis(2,5-dimethylphenol), 4,4'-benzylidenebis(2,5-dimethylphenol), 4,4'-ethylidenebis(2-isopropyl-5-methylphenol),



and combinations of two or more thereof.

17. (canceled).

18. (previously presented) A composition according to Claim ~~17~~11 further comprising at least one Group VIII metal selected from the group consisting of nickel, palladium, cobalt, and combinations of two or more thereof.

19. (original) A composition according to Claim 18 further comprising at least one Lewis acid which is an inorganic compound or organometallic compound in which the element of said inorganic compound or organometallic compound is selected from the group consisting of scandium, titanium, vanadium, chromium, manganese, iron, cobalt, copper, zinc, boron, aluminum, yttrium, zirconium, niobium, molybdenum, cadmium, rhenium, tin, and combinations of two or more thereof.

20. (original) A composition according to Claim 19 wherein said Lewis acid is selected from the group consisting of ZnBr_2 , ZnI_2 , ZnCl_2 , ZnSO_4 , CuCl_2 , CuCl , $\text{Cu}(\text{O}_3\text{SCF}_3)_2$, CoCl_2 , CoI_2 , FeI_2 , FeCl_3 , $\text{FeCl}_2(\text{tetrahydrofuran})_2$, FeCl_2 , $\text{TiCl}_4(\text{tetrahydrofuran})_2$, TiCl_4 , TiCl_3 , $\text{ClTi}(\text{OiPr})_3$, MnCl_2 , ScCl_3 , AlCl_3 , $(\text{C}_8\text{H}_{17})\text{AlCl}_2$, $(\text{C}_8\text{H}_{17})_2\text{AlCl}$, $(\text{iso-C}_4\text{H}_9)_2\text{AlCl}$, $(\text{phenyl})_2\text{AlCl}$, phenylAlCl_2 , ReCl_5 , ZrCl_4 , NbCl_5 , VCl_3 , CrCl_2 , MoCl_5 , YCl_3 , CdCl_2 , LaCl_3 , $\text{Er}(\text{O}_3\text{SCF}_3)_3$, $\text{Yb}(\text{O}_2\text{CCF}_3)_3$, SmCl_3 , TaCl_5 , CdCl_2 , $\text{B}(\text{C}_6\text{H}_5)_3$, and $(\text{C}_6\text{H}_5)_3\text{SnX}$, and combinations of two or more thereof; and X is selected from the group consisting of CF_3SO_3 , $\text{CH}_3\text{C}_6\text{H}_5\text{SO}_3$, $(\text{C}_6\text{H}_5)_3\text{BCN}$, and combinations of two or more thereof.

21. (original) A composition according to Claim 20 wherein said Lewis acid is selected from the group consisting of zinc chloride, cadmium chloride, iron chloride, triphenylboron, $(\text{C}_6\text{H}_5)_3\text{SnX}$, and combinations of two or more thereof; and X is selected from the group consisting of CF_3SO_3 , $\text{CH}_3\text{C}_6\text{H}_5\text{SO}_3$, $(\text{C}_6\text{H}_5)_3\text{BCN}$, and combinations of two or more thereof.

22~33. (canceled)

34. (original) A process comprising (a) contacting PCl_3 with a polyhydric alcohol to produce a phosphorus-containing polymer and (b) contacting said phosphorus-containing polymer with an aromatic diol.

35. (withdrawn) A process comprising (a) contacting an N,N-dialkyl dichlorophosphoramidite with a polyhydric alcohol to produce a polymeric phosphoramidite, (b) contacting said polymeric phosphoramidite with an acid to produce a phosphorus-containing polymer and (c) contacting said phosphorus-containing polymer with an aromatic diol.

36. (withdrawn) A process according to Claim 34 or 35 wherein said polyhydric alcohol is selected from the group consisting of dialcohols, trialcohols, tetraalcohols, and combinations of two or more thereof.

37. (withdrawn) A process according to Claim 36 wherein said polyhydric alcohol is selected from the group consisting of $(R^4)(HO)_m-Ar^2-A^1-Ar^2-(OH)_m(R^4)$, $(R^4)(HO)_m-Ar^2-(O-A^1)_p-O-Ar^2-(OH)_m(R^4)$, $(R^4)(OH)_m-Ar^2-Ar^2-(OH)_m(R^4)$, $(R^4)(OH)_m-Ar^2-A^2-Ar^2-(OH)_m(R^4)$, $(R^4)(HO)_m-Ar^2-A^1-C(O)-O-A^1-O-C(O)-A^1-Ar^2-(OH)_m(R^4)$, $(R^4)(OH)_m-Ar^1-(OH)_m(R^4)$, and combinations of two or more thereof;

each Ar^1 is independently selected from the group consisting of C_6 to C_{40} phenylene group, C_{12} to C_{40} biphenylene group, C_{10} to C_{40} naphthylene group, C_{20} to C_{40} binaphthylene group, and combinations of two or more thereof;

each Ar^2 is independently selected from the group consisting of C_6 to C_{40} phenylene group, C_{10} to C_{40} naphthylene group, and combinations thereof;

each A^1 is independently a C_1 to C_{12} alkylene group;

each A^2 is independently selected from the group consisting of $-C(R^1)(R^1)$, $-O-$, $-N(R^1)-$, $-S-$, $-S(O)_2-$, $-S(O)-$, and combinations of two or more thereof;

each R^1 is independently selected from the group consisting of hydrogen, C_1 to C_{12} alkyl or cycloalkyl group, C_6 to C_{20} aryl group, and combinations of two or more thereof;

each R^4 is independently selected from the group consisting of hydrogen, C_1 to C_{12} alkyl or cycloalkyl group, acetal, ketal, $-OR^3$, $-CO_2R^3$, C_1 to C_{20} aryl group, $-SiR^3$, $-NO_2$, $-SO_3R^3$, $-S(O)R^3$, $-S(O)_2R^3$, $-CHO$, $-C(O)R^3$, F , Cl , $-CN$, perhaloalkyl, $-C(O)N(R^3)(R^3)$, $-A^1Z$, and combinations of two or more thereof;

Z is selected from the group consisting of $-CO_2R^3$, $-CHO$, $-C(O)R^3$, $-C(O)SR^3$, $-SR^3$, $-C(O)NR^1R^1$, $-OC(O)R^3$, $-OC(O)OR^3$, $-N=C(R^1)R^1$, $-C(R^1)=NR^1$, $-C(R^1)=N-O-R^1$, $-P(O)(OR^3)(OR^3)$, $-S(O)_2R^3$, $-S(O)R^3$, $-C(O)OC(O)R^3$, $-NR^3CO_2R^3$, $-NR^3C(O)N(R^1)R^1$, F , Cl , $-NO_2$, $-SO_3R^3$, $-CN$, and combinations of two or more thereof;

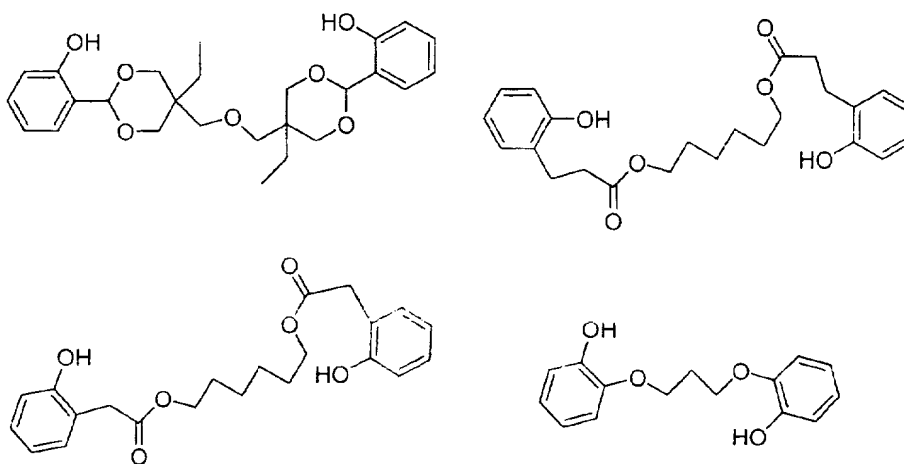
each R^3 is independently selected from the group consisting of C_1 to C_{12} alkyl or cycloalkyl group, C_6 to C_{20} aryl group, and combinations thereof;

each m is independently a number in the range of from 1 to 2; and
each p is independently a number in the range of from 1 to 10.

38. (withdrawn) A process according to Claim 36 wherein said polyhydric alcohol is selected from the group consisting of $(OH)_m (R^4)Ar^1-Ar^1(R^4)(OH)_m$ and $(OH)_m (R^4)Ar^1-A^1-Ar^1 (R^4)(OH)_m$; Ar^1 and A^1 are the same as recited in Claim 14; and each R^4 is independently selected from the group consisting of C_1 to C_{12} alkyl or cycloalkyl group, acetal, ketal, $-OR^3$, $-CO_2R^3$, C_1 to C_{20} aryl group, $-SiR^3$, $-SO_3R^3$, $-S(O)R^3$, $-S(O)_2R^3$, perhaloalkyl, $-C(O)N(R^3)(R^3)$, $-A^1CO_2R^3$, $-A^1OR^3$ and combinations of two or more thereof.

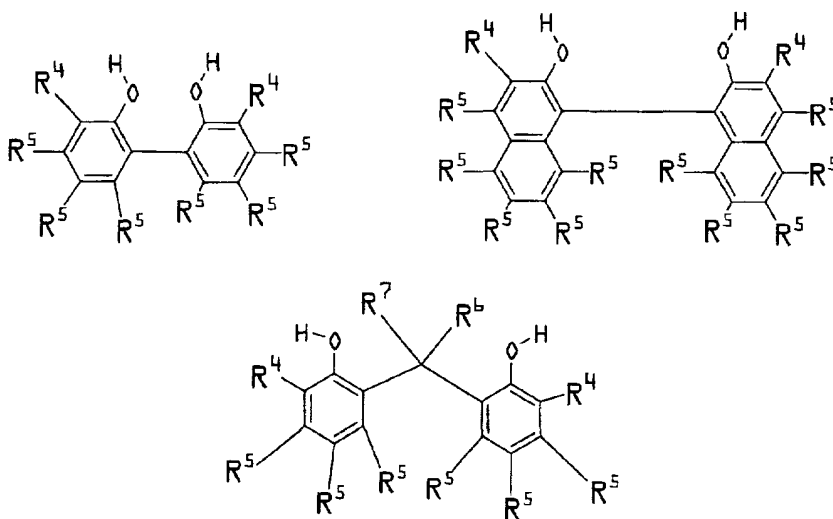
39. (withdrawn) A process according to Claim 38 wherein the location of the OH groups of said polyhydric alcohol are placed such that, when said polyhydric alcohol is contacted with PCl_3 , monodentate phosphites are not predominately produced.

40. (withdrawn) A process according to Claim 39 wherein said polyhydric alcohol is selected from the group consisting of 6,6'-dihydroxy-4,4,4',7,7,7'-hexamethyl bis-2,2'-spirochroman, 2,2'-diallylbisphenolA, bisphenol A, 4,4'-(1-methylethylidene)bis(2-(1-methylpropyl)phenol), 4,4'-thiophenol, 4,4'-dihydroxydiphenylsulfone, 4,4'-sulfonylbis(2-methylphenol), bis(4-hydroxy-3-methylphenyl)sulfide, 2,2'-dis(4-hydroxy-3-methylphenyl)propane, 4,4'-ethylidenebis(2,5-dimethylphenol), 4,4'-propylidenebis(2,5-dimethylphenol), 4,4'-benzylidenebis(2,5-dimethylphenol), 4,4'-ethylidenebis(2-isopropyl-5-methylphenol),



and combinations of two or more thereof.

41. (withdrawn) A process according to Claim 34 or 35 wherein said aromatic diol has the formula selected from the group consisting of



and combinations of two or more thereof;

each R^4 is independently selected from the group consisting of hydrogen, C_1 to C_{12} alkyl group, C_1 to C_{12} cycloalkyl group, acetal, ketal, $-OR^3$, $-CO_2R^3$, C_1 to C_{20} aryl group, $-SiR^3$, $-NO_2$, $-SO_3R^3$, $-S(O)R^3$, $-S(O)_2R^3$, $-CHO$, $-C(O)R^3$, $-F$, $-Cl$, $-CN$, $-CF_3$, $-C(O)N(R^3)(R^3)$, $-A^1Z$, and combinations of two or more thereof;

Z is selected from the group consisting of $-CO_2R^3$, $-CHO$, $-C(O)R^3$, $-C(O)SR^3$, $-SR^3$, $-C(O)NR^1R^1$, $-OC(O)R^3$, $-OC(O)OR^3$, $-N=CR^1R^1$, $-C(R^1)=NR^1$,

$-C(R^1)=N-O-R^1$, $-P(O)(OR^3)(OR^3)$, $-S(O)_2R^3$, $-S(O)R^3$, $-C(O)OC(O)R^3$, $-NR^3CO_2R^3$, $-NR^3C(O)NR^1R^1$, F , Cl , $-NO_2$, $-SO_3R^3$, $-CN$, and combinations of two or more thereof;

each R^3 is independently selected from the group consisting of C_1 to C_{12} alkyl or cycloalkyl group, C_1 to C_{20} aryl group, and combinations of two or more thereof;

each R^5 is independently selected from the group consisting of H , F , Cl , C_1 to C_{12} alkyl or cycloalkyl, C_6 to C_{20} aryl, $-OR^3$, $-CO_2R^3$, $-C(O)R^3$, $-CHO$, $-CN$, $-CF_3$, and combinations of two or more thereof;

each R^6 independently is selected from the group consisting of H, C_1 to C_{12} alkyl or cycloalkyl, C_6 to C_{20} aryl, and combinations of two or more thereof; and

each R^7 independently is selected from the group consisting of H, C_1 to C_{12} alkyl or cycloalkyl, C_6 to C_{20} aryl, and combinations of two or more thereof.

42. (withdrawn) A process comprising an unsaturated compound with a fluid comprising hydrogen cyanide in the presence of a catalyst composition recited in any of Claims 18 to 21.

43. (withdrawn) A process according to Claim 42 wherein said unsaturated compound has 2 to about 30 carbon atoms per molecule and is selected from the formula of $R^8CH=CH-CH=CR^9$, $CH=CH-(CH_2)_x-R^{10}$, $CH_3-(CH_2)_y-CH=CH-(CH_2)_x-R^{10}$, and combinations of two or more thereof;

R^8 and R^9 are each independently selected from the group consisting of H, C_1 to C_3 alkyl, and combinations thereof;

R^{10} is selected from the group consisting of H, CN, CO_2R^{11} , perfluoroalkyl group having 1 to about 20 carbon atoms, and combinations of two or more thereof;

y is an integer of 0 to 12;

x is an integer of 0 to 12 if R^{10} is H, CO_2R^{11} , or perfluoroalkyl;

x is an integer of 1 to 12 if R^{10} is CN; and

R^{11} is selected from the group consisting of C_1 to C_{12} alkyl or cycloalkyl group, C_6 to C_{20} aryl group, and combinations of two or more thereof.

44. (withdrawn) A process according to Claim 43 wherein said unsaturated compound is selected from the group consisting of butadiene, 3-pentenitrile, 4-pentenitrile, methyl 3-pentenoate, methyl 4-pentenoate, methyl 2-pentenoate, and combinations of two or more thereof.

45. (withdrawn) A process comprising (a) contacting a diolefinic compound, in the presence of a catalyst composition, with a fluid comprising hydrogen cyanide to produce a 2-alkyl-3-monoalkenenitrile; and

(b) contacting said 2-alkyl-3-monoalkenenitrile with said catalyst composition wherein said catalyst composition is the composition recited in claims 18-21.

46. (withdrawn) A process according to Claim 45 wherein said diolefinic compound is butadiene.

47. (withdrawn) A process according to Claim 45 wherein said 2-alkyl-3-monoalkenenitrile is 2-methyl-3-butenitrile.

48. (withdrawn) A process comprising contacting a 2-alkyl-3-monoalkenenitrile with a catalyst composition wherein said catalyst composition is the composition recited in Claims 18-21.

49. (withdrawn) A process according to Claim 48 wherein said 2-alkyl-3-monoalkenenitrile is 2-methyl-3-butenitrile.

50. (withdrawn) A polymeric composition comprising repeat units derived from (1) a carbonyl compound, (2) a monomer, and (3) phosphorochloridite wherein said carbonyl compound has the formula selected from the group consisting of $(R^1O_2C)_m(OH)-Ar^1-(OH)(CO_2R^1)_m$, $(R^1O_2C)_m(OH)-Ar^2-A^2-Ar^2-(OH)(CO_2R^1)_m$, $(R^1O_2C)_m(OH)-Ar^2-Ar^2-(OH)(CO_2R^1)_m$ and combinations of two or more thereof;

said monomer is selected from the group consisting of polyhydric alcohols, amines, and combinations thereof,

said phosphorochloridite has the formula selected from the group consisting of $ClP(O-Ar^2-R^2)_2$; the Ar^2 groups in $ClP(O-Ar^2-R^2)_2$ are unlinked to each other, directly linked to each other, or linked to each other through group A^2 ;

each Ar^1 is selected from the group consisting of C_6 to C_{40} phenylene group, C_{12} to C_{40} biphenylene group, C_{10} to C_{40} naphthylene group, C_{20} to C_{40} binaphthylene group, and combinations of two or more thereof;

each Ar^2 is independently selected from the group consisting of C_6 to C_{40} phenylene group, C_{10} to C_{40} naphthylene group, and combinations thereof;

A² is selected from the group consisting of -C(R¹)(R¹), -O-, -N(R¹)-, -S-, -S(O)₂-, -S(O)-, and combinations of two or more thereof;

each R¹ is independently selected from the group consisting of hydrogen, C₁ to C₁₂ alkyl group or cycloalkyl group, C₆ to C₂₀ aryl group, and combinations of two or more thereof;

each R² is independently selected from the group consisting of hydrogen, C₁ to C₁₂ alkyl or cycloalkyl group, acetal, ketal, -OR³, -CO₂R³, C₆ to C₂₀ aryl group, F, Cl, -NO₂, -SO₃R³, -CN, perhaloalkyl, -S(O)R³, -S(O)₂R³, -CHO, -C(O)R³, cyclic ether, -A¹Z, and combinations of two or more thereof;

A¹ is a C₁ to C₁₂ alkylene group;

Z is selected from the group consisting of -CO₂R³, -CHO, -C(O)R³, -C(O)SR³, -SR³, -C(O)NR¹R¹, -OC(O)R³, -OC(O)OR³, -N=C(R¹)R¹, -C(R¹)=NR¹, -C(R¹)=N-O-R¹, -P(O)(OR³)(OR³), -S(O)₂R³, -S(O)R³, -C(O)OC(O)R³, -NR³CO₂R³, -NR³C(O)N(R¹)R¹, F, Cl, -NO₂, -SO₃R³, -CN, and combinations of two or more thereof;

each R³ is independently selected from the group consisting of C₁ to C₁₂ alkyl or cycloalkyl group, C₆ to C₂₀ aryl group, and combinations thereof; and

each m is independently a number in the range of from 1 to 2 further comprising at least one Group VIII metal selected from the group consisting of nickel, palladium, cobalt, and combinations of two or more thereof.

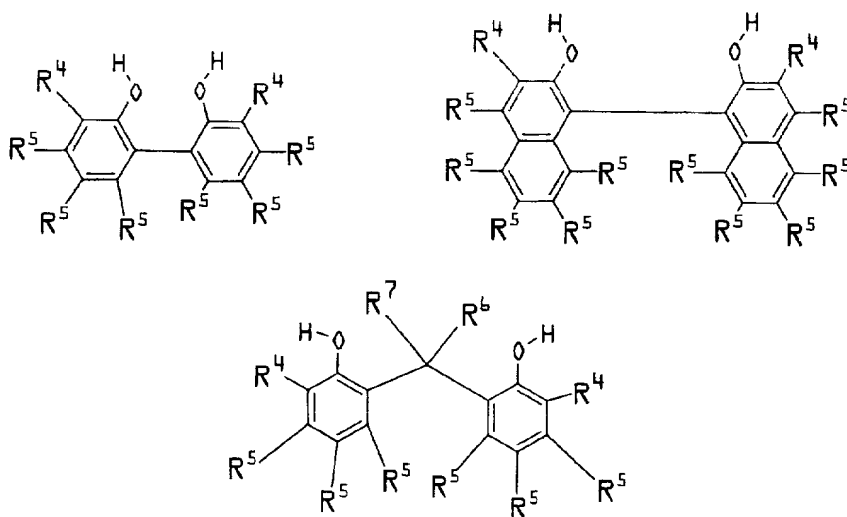
51. (withdrawn) The composition of claim 50 further comprising at least one Lewis acid which is an inorganic compound or organometallic compound in which the element of said inorganic compound or organometallic compound is selected from the group consisting of scandium, titanium, vanadium, chromium, manganese, iron, cobalt, copper, zinc, boron, aluminum, yttrium, zirconium, niobium, molybdenum, cadmium, rhenium, tin, and combinations of two or more thereof.

52. (withdrawn) The composition of claim 51 wherein said Lewis acid is selected from the group consisting of ZnBr₂, ZnI₂, ZnCl₂, ZnSO₄, CuCl₂, CuCl, Cu(O₃SCF₃)₂, CoCl₂, CoI₂, FeI₂, FeCl₃, FeCl₂(tetrahydrofuran)₂, FeCl₂, TiCl₄(tetrahydrofuran)₂, TiCl₄, TiCl₃,

ClTi(OiPr)₃, MnCl₂, ScCl₃, AlCl₃, (C₈H₁₇)AlCl₂, (C₈H₁₇)₂AlCl, (iso-C₄H₉)₂AlCl, (phenyl)₂AlCl, phenylAlCl₂, ReCl₅, ZrCl₄, NbCl₅, VCl₃, CrCl₂, MoCl₅, YCl₃, CdCl₂, LaCl₃, Er(O₃SCF₃)₃, Yb(O₂CCF₃)₃, SmCl₃, TaCl₅, CdCl₂, B(C₆H₅)₃, and (C₆H₅)₃SnX, and combinations of two or more thereof; and X is selected from the group consisting of CF₃SO₃, CH₃C₆H₅SO₃, (C₆H₅)₃BCN, and combinations of two or more thereof.

53. (withdrawn) The composition of claim 52 wherein said Lewis acid is selected from the group consisting of zinc chloride, cadmium chloride, iron chloride, triphenylboron, (C₆H₅)₃SnX, and combinations of two or more thereof; and X is selected from the group consisting of CF₃SO₃, CH₃C₆H₃SO₃, (C₆H₃)₃BCN, and combinations of two or more thereof.

54. (withdrawn) A composition according to claim 15 wherein said aromatic diol has the formula selected from the group consisting of



and combinations of two or more thereof;

each R⁴ is independently selected from the group consisting of hydrogen, C₁ to C₁₂ alkyl or cycloalkyl group, acetal, ketal, -OR³, -CO₂R³, C₆ to C₂₀ aryl group, -SiR³, -NO₂, SO₃R³, S(O)R³, S(O)₂R³, -CHO, -C(O)R³, -F, -Cl, -CN,

-CF₃, -C(O)N(R³)(R³), -A¹Z, and combinations of two or more thereof;

Z is selected from the group consisting of $-\text{CO}_2\text{R}^3$, $-\text{CHO}$, $-\text{C}(\text{O})\text{R}^3$, $-\text{C}(\text{O})\text{SR}^3$, $-\text{SR}^3$, $-\text{C}(\text{O})\text{NR}^1\text{R}^1$, $-\text{OC}(\text{O})\text{R}^3$, $-\text{OC}(\text{O})\text{OR}^3$, $-\text{N}=\text{CR}^1\text{R}^1$, $-\text{C}(\text{R}^1)=\text{NR}^1$, $-\text{C}(\text{R}^1)=\text{N}-\text{O}-\text{R}^1$, $-\text{P}(\text{O})(\text{OR}^3)(\text{OR}^3)$, $-\text{S}(\text{O})_2\text{R}^3$, $-\text{S}(\text{O})\text{R}^3$, $-\text{C}(\text{O})\text{OC}(\text{O})\text{R}^3$, $-\text{NR}^3\text{CO}_2\text{R}^3$, $-\text{NR}^3\text{C}(\text{O})\text{NR}^1\text{R}^1$, F, Cl, $-\text{NO}_2$, $-\text{SO}_3\text{R}^3$, $-\text{CN}$, and combinations of two or more thereof;

each R^3 is independently selected from the group consisting of C_1 to C_{12} alkyl or cycloalkyl group, C_6 to C_{20} aryl group, and combinations of two or more thereof;

each R^5 is independently selected from the group consisting of H, F, Cl, C_1 to C_{12} alkyl, C_1 to C_{12} cycloalkyl, C_6 to C_{20} aryl, $-\text{OR}^3$, $-\text{CO}_2\text{R}^3$, $-\text{C}(\text{O})\text{R}^3$, $-\text{CHO}$, $-\text{CN}$, $-\text{CF}_3$, and combinations of two or more thereof;

each R^6 independently is selected from the group consisting of H, C_1 to C_{12} alkyl, C_1 to C_{12} cycloalkyl, C_6 to C_{20} aryl, and combinations of two or more thereof; and

each R^7 independently is selected from the group consisting of H, C_1 to C_{12} alkyl, C_1 to C_{12} cycloalkyl, C_6 to C_{20} aryl, and combinations of two or more thereof.

55. (withdrawn) A composition according to any of Claims 15 further comprising at least one Group VIII metal selected from the group consisting of nickel, palladium, cobalt, and combinations of two or more thereof.

56. (withdrawn) A composition according to any of Claims 16 further comprising at least one Group VIII metal selected from the group consisting of nickel, palladium, cobalt, and combinations of two or more thereof.

57. (withdrawn) A composition according to claim 55 further comprising at least one Lewis acid which is an inorganic compound or organometallic compound in which the element of said inorganic compound or organometallic compound is selected from the group consisting of scandium, titanium, vanadium, chromium, manganese, iron, cobalt, copper, zinc, boron, aluminum, yttrium, zirconium, niobium, molybdenum, cadmium, rhenium, tin, and combinations of two or more thereof.

58. (withdrawn) A composition according to Claim 57 wherein said Lewis acid is selected from the group consisting of ZnBr_2 , ZnI_2 , ZnCl_2 , ZnSO_4 , CuCl_2 , CuCl , $\text{Cu}(\text{O}_3\text{SCF}_3)_2$, CoCl_2 , CoI_2 , FeI_2 , FeCl_3 , $\text{FeCl}_2(\text{tetrahydrofuran})_2$, FeCl_2 , $\text{TiCl}_4(\text{tetrahydrofuran})_2$, TiCl_4 , TiCl_3 , $\text{ClTi}(\text{OiPr})_3$, MnCl_2 , ScCl_3 , AlCl_3 , $(\text{C}_8\text{H}_{17})\text{AlCl}_2$, $(\text{C}_8\text{H}_{17})_2\text{AlCl}$, $(\text{iso-C}_4\text{H}_9)_2\text{AlCl}$, $(\text{phenyl})_2\text{AlCl}$, phenylAlCl_2 , ReCl_5 , ZrCl_4 , NbCl_5 , VCl_3 , CrCl_2 , MoCl_5 , YCl_3 , CdCl_2 , LaCl_3 , $\text{Er}(\text{O}_3\text{SCF}_3)_3$, $\text{Yb}(\text{O}_2\text{CCF}_3)_3$, SmCl_3 , TaCl_5 , CdCl_2 , $\text{B}(\text{C}_6\text{H}_5)_3$, and $(\text{C}_6\text{H}_5)_3\text{SnX}$, and combinations of two or more thereof; and X is selected from the group consisting of CF_3SO_3 , $\text{CH}_3\text{C}_6\text{H}_5\text{SO}_3$, $(\text{C}_6\text{H}_5)_3\text{BCN}$, and combinations of two or more thereof.

59. (withdrawn) A composition according to Claim 58 wherein said Lewis acid is selected from the group consisting of zinc chloride, cadmium chloride, iron chloride, triphenylboron, $(\text{C}_6\text{H}_5)_3\text{SnX}$, and combinations of two or more thereof; and X is selected from the group consisting of CF_3SO_3 , $\text{CH}_3\text{C}_6\text{H}_5\text{SO}_3$, $(\text{C}_6\text{H}_5)_3\text{BCN}$, and combinations of two or more thereof.

60. (withdrawn) A composition according to claim 56 further comprising at least one Lewis acid which is an inorganic compound or organometallic compound in which the element of said inorganic compound or organometallic compound is selected from the group consisting of scandium, titanium, vanadium, chromium, manganese, iron, cobalt, copper, zinc, boron, aluminum, yttrium, zirconium, niobium, molybdenum, cadmium, rhenium, tin, and combinations of two or more thereof.

61. (withdrawn) A composition according to Claim 60 wherein said Lewis acid is selected from the group consisting of ZnBr_2 , ZnI_2 , ZnCl_2 , ZnSO_4 , CuCl_2 , CuCl , $\text{Cu}(\text{O}_3\text{SCF}_3)_2$, CoCl_2 , CoI_2 , FeI_2 , FeCl_3 , $\text{FeCl}_2(\text{tetrahydrofuran})_2$, FeCl_2 , $\text{TiCl}_4(\text{tetrahydrofuran})_2$, TiCl_4 , TiCl_3 , $\text{ClTi}(\text{OiPr})_3$, MnCl_2 , ScCl_3 , AlCl_3 , $(\text{C}_8\text{H}_{17})\text{AlCl}_2$, $(\text{C}_8\text{H}_{17})_2\text{AlCl}$, $(\text{iso-C}_4\text{H}_9)_2\text{AlCl}$, $(\text{phenyl})_2\text{AlCl}$, phenylAlCl_2 , ReCl_5 , ZrCl_4 , NbCl_5 , VCl_3 , CrCl_2 , MoCl_5 , YCl_3 , CdCl_2 , LaCl_3 , $\text{Er}(\text{O}_3\text{SCF}_3)_3$, $\text{Yb}(\text{O}_2\text{CCF}_3)_3$, SmCl_3 , TaCl_5 , CdCl_2 , $\text{B}(\text{C}_6\text{H}_5)_3$, and $(\text{C}_6\text{H}_5)_3\text{SnX}$, and combinations of two or more thereof; and X is selected from the group consisting of CF_3SO_3 , $\text{CH}_3\text{C}_6\text{H}_5\text{SO}_3$, $(\text{C}_6\text{H}_5)_3\text{BCN}$, and combinations of two or more thereof.

62. (withdrawn) A composition according to Claim 61 wherein said Lewis acid is selected from the group consisting of zinc chloride, cadmium chloride, iron chloride, triphenylboron, $(C_6H_5)_3SnX$, and combinations of two or more thereof; and X is selected from the group consisting of CF_3SO_3 , $CH_3C_6H_3SO_3$, $(C_6H_3)_3BCN$, and combinations of two or more thereof.